Adapting Soliton-Based Continuous Collimation from Space-Based High-Energy Platforms to Form the Basis of Sub-Aquatic High-Energy Point Defense

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Introduction

As soliton technology has opened the door to a wide variety of novel technological innovations including space-based submarine detection, high-bandwidth SATCOM, continuous beam collimation in both diffusive and non-diffusive environments and controlled EM redirection in mid-flight just to name a few, an opportunity exists to employ the technology in order to enhance ship-board defenses of surface ships against torpedo-based attacks.

Abstract

LASERs have been demonstrated to be effective, under certain circumstances, against airborne surface littoral targets. The challenge of ensuring sufficient beam collimation at extreme ranges even when the medium in question is mere air has been a significant one, but one which is being overcome with the assistance of soliton enveloping.

Despite water's massively higher density and light-diffusive tendencies, soliton/LASER emitters used in conjunction as part of a defense system emplaced below the water line on the hull of surface ships can provide a means of delivering powerful LASER light to an incoming torpedo at substantial range.

While a great deal of focus of late has been on the threat of air-to-surface/air-to-sea missiles, sub-launched torpedo attack continues to pose a very real threat to surface ships. While surface ships have a wide range of options available for defending against airborne attacks (multiple missile systems, CIWS, etc.) they lack virtually any meaningful countermeasures against torpedoes.

As with other systems employing the soliton enveloping technique, the principles of physics remain the same. The accompaniment of soliton waves along with the focused LASER light provides a powerful source of inwardly-focused magnetism that has the effect of continually counteracting beam diffusion as the light moves through the desired medium, be it vacuum, atmosphere, or water. In this way, as the beam arrives at its target, its level of strength is nearly 100% of what it was at the time of emission.

Torpedoes, which employ active homing during their final phase of operation, would be easy pickings for such a system given that this active homing could be used to accurately fix the position of the torpedoes and destroy them using the SHEPD system.

Conclusion

It continues to be important for agencies to communicate, when appropriate, concerning technologies that may have cross-domain application.